

REMARKS

1. Claim Rejections - 35 U.S.C. § 103

Claims 1-8, 10, 11, 14 and 15 have been rejected under 35 U.S.C. § 103(c) over U.S. Patent No. 4,962,708 to Synder in view of U.S. Patent No. 6,867,512 to Delaire and in further view of U.S. Patent No. 6,546,873 to Andrejkovics and in further view of U.S. Statutory Invention Registration No. H1068 to Huhmann.

Independent claim 1 is directed to a detonation initiator and recites the features of a linear actuator that is activated by the discharging of a capacitor. The claimed capacitor is charged with an electrical pulse that is received by the detonator initiator.

As claimed, discharging of the capacitor occurs when the capacitor reaches a charge threshold. The charge on the capacitor is monitored by an electrical circuit that derives all operational power from the pulse that charges the capacitor. Also, the electrical circuit includes a digital logic gate that is configured as a comparator to compare a representation of the charge of the capacitor with a reference voltage established from the electrical pulse used to charge the capacitor.

These features are novel and are unobvious over the art of record. In particular, none of Synder, Delaire, Andrejkovics, Huhmann or their combination disclose the claimed "electrical circuit for monitoring charge on the capacitor and discharging the capacitor" to drive a linear actuator, and where all operational power for the circuit is derived from the pulse that charges the capacitor.

It will be appreciated that the claimed combination of features allows for remote detonation of an explosive charge using, in part, an electrical circuit that derives operating power from an electrical pulse input to the detonation initiator. In this regard, no additional power supply sources or circuitry is needed for the detonation initiator. Further, the claimed arrangement allows for sufficient charge to be stored by the capacitor even when a less than optimal electrical pulse can be delivered to the detonation initiator (e.g., a reduction in pulse voltage as may be caused by degraded batteries of a radio receiver assembly used to supply the pulse). Even in this situation,

the stored charge may be converted into enough mechanical energy to initiate a desired detonation.

These features have particular advantage when the electrical pulse is of limited duration, such as when U.S. military personnel are using a standard issue radio receiver to supply the electrical pulse. One such standard issue radio receiver is disclosed in the patent to Andrejkovics, which has been applied by the Examiner as part of the obviousness rejection. In Andrejkovics, however, it is expected that "a fresh alkaline or lithium battery set allows a receiver to remain operational for 15 days" (column 5, lines 65-66). As a result of the claimed invention, soldiers in the battlefield may find a reduced reliance on fresh batteries when attempting to initiate a detonation, which is a distinct improvement in the art.

The Examiner relies on Andrejkovics and Huhmann for disclosing electrical circuitry components of the claimed invention. However, even if one were to assume that motivation exists to combine the references in the proposed manner and that one were to make such a combination, the specifically selected arrangement recited in claim 1 would not result.

Moreover, in the passage of Andrejkovics cited by the Examiner at column 7, lines 45-62 and in figure 5, there is no disclosure of that which is claimed. In this passage, Andrejkovics describes components that require a power source (e.g., a microprocessor-based controller and an RF receiver, among other components) and a firing circuit that has no relevancy as a teaching description when compared to the claimed electrical circuit.

The Examiner further relies on the switching transistors 8 and 10, and the CMOS logic 6 as shown in Huhmann for teaching "a capacitive charging circuit" (office action at page 3, paragraph 6). A summary of Huhmann's arrangement for charging a capacitor is described in Huhmann at page 2, lines 8- 33. In Huhmann, it is clear that electrical energy to charge the capacitor is derived from a battery.

One of ordinary skill in the art will immediately recognize that adding Huhmann to the combination of Synder, Delaire and Andrejkovics as set forth in the earlier action does not result in a combination that arrives at the claimed invention. As recognized by

the Examiner, Huhmann's transistors and logic circuit are used to charge the capacitor to the battery voltage. This is not particularly germane to the claimed invention since the claimed circuitry is used to monitor the capacitor's charge and discharge the capacitor when the charge reaches a threshold. In particular, missing is the disclosure of an arrangement that includes a digital logic gate that is arranged as a comparator to compare a representation of the charge of the capacitor with a reference voltage established from the electrical pulse used to charge the capacitor, as claimed.

Also, Huhmann discloses that the capacitor is to be charged with power from the battery. Huhmann explicitly states that the capacitor "must fully charge to the battery voltage within 50 msec" (page 2, lines 30-33, emphasis added). Missing is the disclosure of an arrangement where "all operational power for the electrical circuit is derived from the electrical pulse" that is also used to charge the capacitor, as claimed. In addition, the Office action merely amounts to a recitation of a parts list derived indiscriminately from the various references with no foundation for how the parts may be combined to arrive at the specifically claimed subject matter.

Moreover, by the introduction of Huhmann to the proposed combination, the proposed combination increases its reliance on batteries. As indicated, the claimed subject matter may be used in a detonation system that has a reduced reliance on batteries. As the power supplying ability of Huhmann's battery becomes diminished with use and/or time, the efficacy of the proposed combination would diminish. As such, it may be concluded that motivation for the proposed combination is lacking since those interested in constructing a mechanical energy detonator having reduced reliance on batteries would not attempt the proposed combination.

As a result, claim 1 and the claims depending from claim 1 recite patentable subject matter.

Claim 16 has been rejected under 35 U.S.C. § 103(a) over Synder, Delaire, Andrejkovics, and Huhmann, and further in view of U.S. Patent No. 3,792,663 to Schneider. Claim 16 depends from claim 1 and is considered allowable for at the reasons set forth above.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

2. Rejoinder of Claims

Claims 17-20 depend from claim 1 and have been withdrawn. If claim 1 is found to be allowable, rejoinder of dependent claims 17-20 is respectfully requested.

3. Conclusion

In light of the foregoing, it is respectfully submitted that the present application is in condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned representative to expedite prosecution of the present application.

If there are any fees resulting from this communication, please charge same to our Deposit Account No. 18-0988, our Order No. 04E007.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By /MDavidGalin/
M. David Galin; Reg. No. 41,767

1621 Euclid Ave.
Nineteenth Floor
Cleveland, Ohio 44115
Tel.: (216) 621-1113
Fax: (216) 621-6165

R:\DGalin\RAYT\IP0254us\RAYTP0254US.R04.wpd